

WHAT IS CLAIMED IS:

1. A reproduced signal waveform processing apparatus,  
comprising:
  - 5 a feedback loop comprising  
sampling means for sampling a reproduced signal at an  
interval of a reproducing clock signal generated at a  
predetermined oscillation frequency;  
a first equalizer for equalizing a digital reproduced  
10 signal obtained by the sampling means;  
phase frequency control means for detecting a phase  
error at a frequency between the digital reproduced signal  
equalized in the first equalizer and the reproducing clock  
signal, and outputting a control signal in accordance with  
15 phase frequency error information between the digital  
reproduced signal and the reproducing clock signal; and  
oscillation means for varying a oscillation frequency  
in accordance with an instruction from the phase frequency  
control means,
  - 20 wherein the feedback loop is a synchronization circuit  
that functions as a phase locked loop (PLL) for synchronizing  
frequency phase between the digital reproduced signal and the  
reproducing clock signal, and  
wherein the reproduced signal waveform processing  
25 apparatus further comprises a second equalizer connected in  
series with the first equalizer.
2. The reproduced signal waveform processing apparatus  
according to Claim 1,
  - 30 wherein the second equalizer means comprises an  
adaptive equalizer having an automatic equalization

function.

3. The reproduced signal waveform processing apparatus according to Claim 1,

5 wherein the first equalizer comprises an IIR filter.

4. The reproduced signal waveform processing apparatus according to claim 1,

10 wherein the phase frequency control means comprises a FIR filter.

5. The reproduced signal waveform processing apparatus according to claim 1,

15 wherein an operating clock of the feedback loop is operated at a frequency that is a multiplication of an operating clock of the second equalizer.

6. The reproduced signal waveform processing apparatus according to claim 1, further comprising:

20 a decimation filter provided between the first and the second equalizers for absorbing a difference in operating clocks of the first and the second equalizers, and

a frequency divider for dividing the reproducing clock signal in the feedback loop and generating a reproducing clock  
25 signal that is supplied to the second equalizer.

7. The reproduced signal waveform processing apparatus according to claim 1,

30 wherein the sampling means is an analog/digital converter.